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The Law Office of Steven G. Roeder  
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EXAMINER
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SMYTH, ANDREW P

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2881

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/770,873

Applicant(s)

POON ET AL.

Examiner

Andrew Smyth

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-72 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-43 and 46-72 is/are rejected.
- 7) ☒ Claim(s) 44-45 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 05/24/2004; 02/02/2004.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_.

***Claim Objections***

1. Claims 44-45 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-16, 41-43, 47-52 are rejected under 35 U.S.C. 102(b) as being anticipated by Skoyles (US 3,389,939).

Regarding applicant's claim 1, Skoyles (figure 3) discloses: a force provider comprising: a provider housing that defines a piston chamber (15), the provider housing including a first beam aperture (31 into 15), a first cylinder aperture (bottom cylinder aperture) that is in fluid communication with a fluid at a first pressure and a spaced apart second cylinder aperture (upper aperture) that is in fluid communication with a fluid that is approximately at the first pressure; and a piston assembly including a piston

(30) positioned in the piston chamber, and a first beam (31) extending through the first beam aperture, the piston including a first piston side and a second piston side, the first beam being secured to the first piston side, the piston moving relative to the provider housing along a piston path, wherein at a first piston region of the piston path, the piston is positioned between the first beam aperture and the first cylinder aperture and at a second piston region of the piston path, the piston is positioned between the cylinder apertures.

Regarding applicant's claim 2, Skoyles (figure 5) discloses: wherein the provider housing includes a second beam aperture (left side of piston, 30), the piston assembly includes a second beam (mirror image beam of 31, on left side) extending through the second beam aperture, the second beam being secured to the second piston side.

Regarding applicant's claim 3, Skoyles (figure 16) discloses: wherein at the first piston region (right side of 30), the pressure of the fluid on the first piston side is greater than the pressure of the fluid on the second piston side (left side of 30); (when system is not in equilibrium either the left or right side can have greater or lesser pressure; see also column 3, lines 74 to column 4, line 2).

Regarding applicant's claim 4, Skoyles (figure 3) discloses: at the second piston region (right side of 30), the pressure of the fluid on the first piston side (right side of 30), is approximately equal to the pressure of the fluid on the second piston side (left side of 30); (when system is in equilibrium the left and right side have approximately equal pressure; see also column 3, lines 74 to column 4, line 2).

Regarding applicant's claim 5, Skoyles (figure 5) discloses: wherein at a third piston region of the piston path, the pressure of the fluid on the second piston side (right side of 30) is greater than the pressure of the fluid on the first piston side (when system is not in equilibrium either the left or right side can have greater or lesser pressure; see also column 3, lines 74 to column 4, line 2).

Regarding applicant's claim 6, Skoyles (figure 5) discloses: wherein in the third piston region, the piston (30) is positioned between the second cylinder aperture (top aperture in cylinder, 10) and a second beam aperture (left beam's aperture) in the provider housing.

Regarding applicant's claim 7, Skoyles (figure 3) discloses: wherein at the second piston region, the pressure of the fluid on the first piston side is approximately equal to the pressure of the fluid on the second piston side (when system is in equilibrium the left and right side have approximately equal pressure; see also column 3, lines 74 to column 4, line 2).

Regarding applicant's claim 8, Skoyles (figure 3) discloses: wherein at a third piston region of the piston path, the pressure of the fluid on the second piston side is greater than the pressure of the fluid on the first piston side (when system is not in equilibrium either the left or right side can have greater or lesser pressure; see also column 3, lines 74 to column 4, line 2).

Regarding applicant's claim 9, Skoyles (figure 5) discloses: wherein in the third piston region, the piston is positioned between the second cylinder aperture ((upper aperture, 10) and a second beam aperture (left side of 31) in the provider housing.

Regarding applicant's claim 10, Skoyles (figure 3) discloses: a wail gap exists between the piston and the provider housing (note gap between 30 and 15) so that the piston moves easily relative to the provider housing.

Regarding applicant's claim 11, Skoyles (figure 10) discloses: a fluid source (66) that directs a fluid into the piston chamber near the first piston region (top).

Regarding applicant's claim 12, Skoyles (figure 10) discloses: the amount of fluid directed into the piston chamber by the fluid source (66) is approximately equal to the amount of fluid that escapes between the piston and the provider housing and between the first beam and the provider housing (column 10, lines 12-24).

Regarding applicant's claim 13, Skoyles (figure 10) discloses: the fluid source (66) directs fluid into the piston chamber so that the pressure on the first piston side does not decrease when the piston is moving in a first direction in the first piston region (column 10, lines 25-34).

Regarding applicant's claim 14, Skoyles (figure 6) discloses: an intermediate piston (39) positioned within the piston chamber (41, 15), the intermediate piston moving concurrently with the piston when the piston (30) is positioned in the first piston region and wherein the piston moves relative to the intermediate piston when the piston is positioned in the second piston region.

Regarding applicant's claim 15, Skoyles (figure 7) discloses: the piston (50) is not fixedly coupled to the intermediate piston (48).

Regarding applicant's claim 16, Skoyles (figure 6) discloses: the first bar (31) extends through the intermediate piston (30).

Regarding applicant's claim 41, Skoyles (figure 6) discloses: a force provider comprising: a provider housing that defines a piston chamber (41, 15); and a piston assembly including a piston (39) and a first intermediate piston (30) positioned within the piston chamber, the piston moving relative to the provider housing along a piston path that includes a first piston region and a second piston region, wherein the first intermediate piston moves concurrently (31) with the piston when the piston is positioned in at least a portion of the first piston region and wherein the piston moves relative (31) to the first intermediate piston when the piston is positioned in the second piston region.

Regarding applicant's claim 42, Skoyles (figure 7) discloses: the piston (50) is not fixedly coupled to the intermediate piston (48).

Regarding applicant's claim 43, Skoyles (figure 6) discloses: a first bar (31) that is secured to the piston (39), the first bar extending through the first intermediate piston (30) and through the provider housing.

Regarding applicant's claim 47, Skoyles (figure 6) discloses: the provider housing includes a first beam aperture, a first cylinder aperture (upper aperture, middle) that is in fluid communication with a fluid (20) at a first pressure and a spaced apart second cylinder aperture (bottom left) that is in fluid communication with a fluid that is approximately at the first pressure, and wherein the piston assembly includes a first beam (31) extending through the first beam aperture, the piston (39) including a first piston side and a second piston side, the first beam being secured to the first piston side, wherein at the first piston region of the piston path, the piston is positioned

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between the first beam aperture and the first cylinder aperture (upper aperture, middle) and at the second piston region of the piston path, the piston is positioned between the cylinder apertures (lower left aperture and upper middle aperture).

Regarding applicant's claim 48, Skoyles discloses: at the first piston region, the pressure of the fluid on the first piston side is greater than the pressure of the fluid on the second piston side (when system is not in equilibrium either the left or right side can have greater or lesser pressure; see also column 3, lines 74 to column 4, line 2).

Regarding applicant's claim 49, Skoyles discloses: at the second piston region, the pressure of the fluid on the first piston side is approximately equal to the pressure of the fluid on the second piston side (when system is not in equilibrium either the left or right side can have greater or lesser pressure; see also column 3, lines 74 to column 4, line 2).

Regarding applicant's claim 50, Skoyles discloses: at a third piston region of the piston path, the pressure of the fluid on the second piston side is greater than the pressure of the fluid on the first piston side (when system is not in equilibrium either the left or right side can have greater or lesser pressure; see also column 3, lines 74 to column 4, line 2).

Regarding applicant's claim 51, Skoyles (figure 6 and figure 5) discloses: in the third piston region, the piston (30) is positioned between the second cylinder aperture (figure 5, upper cylinder aperture, 10) and a second beam aperture (left of 31) in the provider housing.



Regarding applicant's claim 52, Skoyles (figure 6) discloses: a wall gap (41) exists between the piston (39) and the provider housing so that the piston moves easily relative to the provider housing.

3. Claims 23-24, 37-40, and 59-60, 68, and 71-72 are rejected under 35 U.S.C. 102(b) as being anticipated by Yuan et al. (US 6,987,558).

Regarding applicant's claim 23, Yuan (figure 4) discloses: a force provider assembly (column 5, lines 18-20) for use with a mover (column 5, lines 24-33) for moving a stage (201) along a stage path that includes a first stage region and a second stage region, the force provider assembly comprising: a pneumatic (column 5, lines 14-17) force provider coupled to the stage, the force provider providing an acceleration/deceleration force on the stage when the stage is in the first stage region and approximately no force on the stage when the stage is in the second stage region (column 5, lines 20-24).

Regarding applicant's claim 24, Yuan discloses: the stage path includes a third stage region and the force provider provides an acceleration/deceleration force on the stage when the stage is in the third stage region (column 5, lines 20-24).

Regarding applicant's claim 37, Yuan (figure 1) discloses: a stage assembly (66) for moving a device (68), the stage assembly comprising: a stage that retains the device; a mover (column 5, lines 24-33) that moves the stage along the stage path; and a force provider assembly coupled to the stage (column 5, lines 18-20).

Regarding applicant's claim 38, Yuan discloses: an exposure apparatus (21) including the stage assembly (100).

Regarding applicant's claim 39, Yuan discloses: an object (68) on which an image has been formed by the exposure apparatus (21).

Regarding applicant's claim 40, Yuan discloses: a semiconductor wafer (68) on which an image has been formed by the exposure apparatus (21).

Regarding applicant's claim 59, Yuan discloses: a method for accelerating and decelerating a stage (abstract) that is moved along a stage path that includes a first stage region and a second stage region, the method comprising the step of: coupling a pneumatic force provider (column 5, lines 13-17) to the stage (201), the force provider providing an acceleration/deceleration force on the stage when the stage is in the first stage region and approximately no force on the stage when the stage is in the second stage region (column 4, lines 38-48).

Regarding applicant's claim 60, Yuan discloses: a method wherein the stage path includes a third stage region and the force provider provides an acceleration/deceleration force on the stage when the stage is in the third stage region (column 4, lines 38-48).

Regarding applicant's claim 68, Yuan discloses: a method comprising the step of coupling a mover (10) (column 5, lines 18-23) to the stage that moves the stage (201) along the stage path.

Regarding applicant's claim 71, Yuan discloses: a method for making an exposure apparatus (21) comprising the steps of providing an illumination source (84), providing a stage (201), and accelerating and decelerating the stage (abstract).

Regarding applicant's claim 72, Yuan discloses: a method of making a wafer (68) including the steps of providing a substrate (column 12, lines 11-27) and forming an image on the substrate with the exposure apparatus (21).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 17-22, 25-36, 53-58, 61-67, and 69-70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Skoyles (US 3,389,939) and in light of Yuan et al. (US 6,987,558).

Regarding applicant's claim 17, Skoyles discloses the force provider elements of claim 1, that claim 17 depends upon, see above.

However, Skoyles lacks: a stage assembly for moving a device along a stage path that includes a first stage region and a second stage region, the stage assembly comprising: a stage that retains the device; a mover that moves the stage along the stage path; and the force provider of claim 1 coupled to the stage.

Yuan, teaches: a stage assembly (66) for moving (column 4, 38-42) a device (68) along a stage path that includes a first stage region and a second stage region, the stage assembly comprising: a stage that retains the device; a mover that moves the stage along the stage path; and the force provider of claim 1 coupled to the stage.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine a fluidic pressure system as the means for force providing as disclosed by Skoyles to move an assembly stage for a specimen as disclosed by Yuan, to move the specimen into proper position for the exposure apparatus.

Regarding applicant's claims 18-22, Skoyles discloses: the force provider elements of claim 1, that claim 17 depends upon, see above.

However, Skoyles lacks some elements of claims 18-22.

For applicant's claim 18: Yuan, teaches: wherein the force provider provides an acceleration/deceleration force on the stage when the stage is in the first stage region and approximately no force on the stage when the stage is in the second stage region (column 4, 38-42).

For applicant's claim 19: Yuan, teaches: the stage path includes a third stage region and the force provider provides an acceleration/deceleration force on the stage when the stage is in the third stage region (column 4, 35-48)..

For applicant's claim 20: Yuan, teaches: an exposure apparatus including the stage assembly (column 4, 42-48).

For applicant's claim 21: Yuan (figure 1), teaches: an object (68) on which an image has been formed by the exposure apparatus (21).

For applicant's claim 22: Yuan, teaches: 22. A semiconductor wafer (68) on which an image has been formed by the exposure apparatus (21).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the force provider elements of Skoyles with a stage for positioning a wafer / object for exposure control positioning as taught by Yuan, to enable finite positioning of the exposure beam by moving the stage holding the wafer/ object in order to create detailed patterns on the wafer/ object.

Regarding applicant's claim 25, Yuan discloses the force provider assembly elements of claim 23, that claim 25 depends upon, see above.

However, Yuan lacks: the force provider comprises (i) a provider housing that defines a piston chamber, the provider housing including a first beam aperture, a first cylinder aperture that is in fluid communication with a fluid at a first pressure and a spaced apart second cylinder aperture that is in fluid communication with a fluid at approximately the first pressure; and (ii) a piston assembly including a piston positioned in the piston

chamber, and a first beam extending through the first beam aperture, the piston including a first piston side and a second piston side, the first beam being secured to the first piston side, the piston moving relative to the provider housing along a piston path, wherein at a first piston region of the piston path, the piston is positioned between the first beam aperture and the first cylinder aperture and at a second piston region of the piston path, the piston is positioned between the cylinder apertures.

Skoyles, teaches: the elements of claim 25, see rejection of claim 1 above.

Skoyles, teaches: the elements of claim 26, see rejection of claims 1 and 2 above.

Skoyles, teaches: the elements of claim 27, see rejection of claim 3 above.

Skoyles, teaches: the elements of claim 28, see rejection of claim 4 above.

Skoyles, teaches: the elements of claim 29, see rejection of claim 5 above.

Skoyles, teaches: the elements of claim 30, see rejection of claim 6 above.

Skoyles, teaches: the elements of claim 31, see rejection of claim 10 above.

Skoyles, teaches: the elements of claim 32, see rejection of claim 11 above.

Skoyles, teaches: the elements of claim 33, see rejection of claim 12 above.

Skoyles, teaches: the elements of claim 34, see rejection of claim 13 above.

Skoyles, teaches: the elements of claim 35, see rejection of claim 14 above.

Skoyles, teaches: the elements of claim 36, see rejection of claim 15 above.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the force provider assembly elements of Yuan with the pressure regions, fluid flow, and piston configuration elements as taught by Skoyles to

transfer force from the force provider to the object to be moved, the stage assembly, for finite position control of the stage assembly and wafer/ object carried by the stage.

Regarding applicant's claim 53, Skoyles discloses the elements of claim 41 that claim 53 depends upon, see above.

However, Skoyles lacks: a stage assembly for moving a device along a stage path that includes a first stage region and a second stage region, the stage assembly comprising: a stage that retains the device; a mover that moves the stage along the stage path; and the force provider coupled to the stage.

Yuan, teaches: a stage assembly (100) for moving a device (68) along a stage path that includes a first stage region and a second stage region, the stage assembly comprising: a stage (66) that retains the device; a mover (10) that moves the stage along the stage path; and the force provider coupled to the stage.

Regarding applicant's claim 54, Skoyles discloses the elements of claim 41 that claim 54 depends upon, see above.

However, Skoyles lacks: the force provider provides an acceleration/deceleration force on the stage when the stage is in the first stage region and approximately no force on the stage when the stage is in the second stage region.

Yuan, teaches: the force provider provides an acceleration/deceleration force on the stage when the stage is in the first stage region and approximately no force on the stage when the stage is in the second stage region (column 5, lines 20-24).

Regarding applicant's claim 55, Skoyles discloses the elements of claim 41 that claim 55 depends upon, see above.

However, Skoyles lacks: the stage path includes a third stage region and the force provider provides an acceleration/deceleration force on the stage when the stage is in the third stage region.

Yuan, teaches: the stage path includes a third stage region and the force provider provides an acceleration/deceleration force on the stage when the stage is in the third stage region (column 5, lines 20-24).

Regarding applicant's claim 56, Skoyles discloses the elements of claim 41 that claim 56 depends upon, see above.

However, Skoyles lacks: an exposure apparatus including the stage assembly.

Yuan, teaches: an exposure apparatus (21) including the stage assembly (66).

Regarding applicant's claim 57, Skoyles discloses the elements of claim 41 that claim 57 depends upon, see above.

However, Skoyles lacks: an object on which an image has been formed by the exposure apparatus.

Yuan, teaches: an object (68) on which an image has been formed by the exposure apparatus (21).

Regarding applicant's claim 58, Skoyles discloses the elements of claim 41 that claim 58 depends upon, see above.

However, Skoyles lacks: a semiconductor wafer on which an image has been formed by the exposure apparatus.



Yuan, teaches: a semiconductor wafer (68) on which an image has been formed by the exposure apparatus (21).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the force provider elements of Skoyles with the stage assembly, exposure apparatus elements as taught by Yuan to transfer force from the force provider to the object to be moved, the stage assembly, for finite position control for beam exposure placement of the stage assembly and wafer/ object carried by the stage.

Regarding applicant's claim 61, Yuan discloses the elements of claim 59 that claim 61 depends upon, see above.

However, Yuan lacks a method wherein the step of coupling includes the step of providing a force provider that comprises (i) a provider housing that defines a piston chamber, the provider housing including a first beam aperture, a first cylinder aperture that is in fluid communication with a fluid at a first pressure and a spaced apart second cylinder aperture that is in fluid communication with a fluid at approximately the first pressure; and (ii) a piston assembly including a piston positioned in the piston chamber, and a first beam extending through the first beam aperture, the piston including a first piston side and a second piston side, the first beam being secured to the first piston side, the piston moving relative to the provider housing along a piston path, wherein at a first piston region of the piston path, the piston is positioned between the first beam

aperture and the first cylinder aperture and at a second piston region of the piston path, the piston is positioned between the cylinder apertures.

Skoyles, (figure 5) teaches: a method wherein the step of coupling includes the step of providing a force provider (31) that comprises (i) a provider housing that defines a piston chamber, the provider housing including a first beam aperture (31 into the piston chamber), a first cylinder aperture (lower right aperture) that is in fluid communication with a fluid (20) at a first pressure and a spaced apart second cylinder aperture (upper left aperture) that is in fluid communication with a fluid at approximately the first pressure; and (ii) a piston assembly including a piston (30) positioned in the piston chamber, and a first beam (31) extending through the first beam aperture, the piston including a first piston side and a second piston side, the first beam being secured to the first piston side, the piston moving relative to the provider housing along a piston path, wherein at a first piston region of the piston path, the piston is positioned between the first beam aperture and the first cylinder aperture and at a second piston region of the piston path, the piston is positioned between the cylinder apertures.

Regarding applicant's claim 62, Yuan discloses the elements of claim 59 that claim 62 depends upon, see above.

However, Yuan lacks: a method wherein the step of coupling includes the step of providing a force provider that comprises (i) a provider housing that defines a piston chamber, the provider housing including a first beam aperture, a second beam aperture, a first cylinder aperture that is in fluid communication with a fluid at a first pressure and a spaced apart second cylinder aperture that is in fluid communication with a fluid at

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approximately the first pressure; and (ii) a piston assembly including a piston positioned in the piston chamber, a first beam extending through the first beam aperture and a second beam extending through the second beam aperture, the piston including a first piston side and a second piston side, the first beam being secured to the first piston side and the second beam being secured to second piston side, the piston moving relative to the provider housing along a piston path, wherein at a first piston region of the piston path, the piston is positioned between the first beam aperture and the first cylinder aperture and at a second piston region of the piston path, the piston is positioned between the cylinder apertures.

Skoyles, (figure 5) teaches: a method wherein the step of coupling includes the step of providing a force provider (31) that comprises (i) a provider housing that defines a piston chamber, the provider housing including a first beam aperture (right side), a second beam aperture (left side), a first cylinder aperture (lower right) that is in fluid communication with a fluid (20) at a first pressure and a spaced apart second cylinder aperture (upper left) that is in fluid communication with a fluid at approximately the first pressure; and (ii) a piston assembly including a piston (30) positioned in the piston chamber, a first beam (31 right) extending through the first beam aperture and a second beam (31 left) extending through the second beam aperture, the piston including a first piston side and a second piston side, the first beam being secured to the first piston side and the second beam being secured to second piston side, the piston moving relative to the provider housing along a piston path, wherein at a first piston region of the piston path, the piston is positioned between the first beam aperture and the first

cylinder aperture and at a second piston region of the piston path, the piston is positioned between the cylinder apertures.

Regarding applicant's claim 63, Yuan discloses the elements of previous claims that claim 63 depends upon, see above.

However, Yuan lacks: a method wherein at the first piston region, the pressure of the fluid on the first piston side is greater than the pressure of the fluid on the second piston side.

Skoyles, teaches: a method wherein at the first piston region, the pressure of the fluid on the first piston side is greater than the pressure of the fluid on the second piston side (when system is not in equilibrium either the left or right side can have greater or lesser pressure; see also column 3, lines 74 to column 4, line 2).

Regarding applicant's claim 64, Yuan discloses the elements of previous claims that claim 64 depends upon, see above.

However, Yuan lacks: a method wherein at the second piston region, the pressure of the fluid on the first piston side is equal to the pressure of the fluid on the second piston side.

Skoyles, teaches: a method wherein at the second piston region, the pressure of the fluid on the first piston side is equal to the pressure of the fluid on the second piston side (when system is in equilibrium the left and right side have approximately equal pressure; see also column 3, lines 74 to column 4, line 2).

Regarding applicant's claim 65, Yuan discloses the elements of previous claims that claim 65 depends upon, see above.

However, Yuan lacks: a method wherein at a third piston region of the piston path, the pressure of the fluid on the second piston side is greater than the pressure of the fluid on the first piston side.

Skoyles, teaches: a method of wherein at a third piston region of the piston path, the pressure of the fluid on the second piston side is greater than the pressure of the fluid on the first piston side (when system is not in equilibrium either the left or right side can have greater or lesser pressure; see also column 3, lines 74 to column 4, line 2).

Regarding applicant's claim 66, Yuan discloses the elements of previous claims that claim 66 depends upon, see above.

However, Yuan lacks: a method, wherein in the third piston region, the piston is positioned between the second cylinder aperture and the second beam aperture.

Skoyles, (figure 5) teaches: a method, wherein in the third piston region, the piston (30) is positioned between the second cylinder aperture (upper left) and the second beam aperture (left side for 31).

Regarding applicant's claim 67, Yuan discloses the elements of claim 59 that claim 62 depends upon, see above.

However, Yuan lacks: a method comprising the step of directing a fluid from a fluid source into the piston chamber near the first piston region.

Skoyles, (figure 5) teaches: a method comprising the step of directing a fluid from a fluid source (10) into the piston chamber near the first piston region (around 30).

Regarding applicant's claim 69, Yuan discloses the elements of claim 59 that claim 69 depends upon, see above.

However, Yuan lacks: a method wherein the step of coupling includes the step of providing a force provider that comprises (i) a provider housing that defines a piston chamber; and (ii) a piston assembly including a piston and a first intermediate piston positioned within the piston chamber, the piston moving relative to the provider housing along a piston path that includes a first piston region and a second piston region, wherein the first intermediate piston moves concurrently with the piston when the piston is positioned in at least a portion of the first piston region, and wherein the piston moves relative to the first intermediate piston when the piston is positioned in the second piston region.

Skoyles, (figure 6) teaches: a method wherein the step of coupling includes the step of providing a force provider (31) that comprises (i) a provider housing that defines a piston chamber; and (ii) a piston assembly including a piston (39) and a first intermediate piston (30) positioned within the piston chamber, the piston moving relative to the provider housing along a piston path that includes a first piston region and a second piston region, wherein the first intermediate piston moves concurrently (31) with the piston when the piston is positioned in at least a portion of the first piston region, and wherein the piston moves relative (31) to the first intermediate piston when the piston is positioned in the second piston region.

Regarding applicant's claim 70, Yuan discloses the elements of claim 59 that claim 69 depends upon, see above.

However, Yuan lacks: a method wherein the piston is not fixedly coupled to the first intermediate piston.

Skoyles, (figure 7) teaches: a method wherein the piston (50) is not fixedly coupled to the first intermediate piston (48).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the fluidic / pneumatic force provider elements of Skoyles with the stage assembly, stage acceleration method/ control, and exposure apparatus elements as taught by Yuan to transfer force from the force provider to the object to be moved, the stage assembly, for finite position control of beam exposure positioning upon wafer/object upon the stage assembly to increase speed of processing and dexterity.

6. Claim 46 rejected under 35 U.S.C. 103(a) as being unpatentable over Skoyles (US 3,389,939).

Regarding the elements of claim 41 that claim 46 is dependent upon, Skoyles discloses all the elements thereof, see above.

Regarding claim 46, Skoyles discloses: essentially the same invention as it is disclosed in applicant's claim 41. Applicant's claim 46 merely adds a second intermediate piston, since Skoyles discloses a piston and a first intermediate piston, it is obvious, to one skilled in the art at the time the invention was made, to increase the number of intermediate pistons from one two and thus lacks inventive step.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Smyth whose telephone number is 571-270-1746. The examiner can normally be reached on 7:30AM - 5:00PM; Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on 571-272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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